U.S. Department of Transportation

Federal Aviation Administration

Standard

NATIONAL AIRSPACE SYSTEM
(NAS)
SOFTWARE DEVELOPMENT

1. This standard has been approved by the Federal Aviation Administration (FAA).

2. Beneficial comments (recommendations, additions, deletions) and pertinent data which may be of use in improving this document should be addressed to:

Department of Transportation
Federal Aviation Administration
System Engineering and Configuration
Management Division (ASE-200)
800 Independence Ave., S.W.
Washington, D.C. 20591

2. This standard imposes the requirements of the Department of Defense (DOD)-STD-2167A, dated 29 February 1988, with appropriate tailoring of DOD-STD-2167A for specific FAA requirements and practices. Since this standard relies heavily upon the requirements in DOD-STD-2167A, any revisions to DOD-STD-2167A will be reviewed and this standard will be revised as appropriate.

3. This standard is to be used in conjunction with FAA-STD-018, Software Quality Program Requirements.

4. This standard is not intended to specify or discourage the use of any particular software development methods that best support the achievement of contract requirements.

5. This standard, together with the other FAA, DOD, and military documents referenced in Section 2, provides the means for establishing, evaluating, and maintaining quality in software and associated documentation.

6. Data Item Descriptions (DIDs), applicable to this standard are listed in Section 6 of DOD-STD-2167A. These DIDs describe a set of documents for recording the information required by this standard. Production of deliverable data using automated techniques is encouraged.

contractor's software development, testing, and evaluation efforts.

1.2 Purpose. The purpose of this standard is to establish requirements to be applied during the acquisition, development, and support of software systems.

1.3 Application. The requirements of this standard apply to the development of Computer Software Configuration Items (CSCIs). This standard applies to a specific subsystem to the extent specified in the contract clauses, the Statement of Work (SOW), and the Contract Data Requirements List (CDRL).

1.3.1 System development. Application of this standard must be coordinated with MIL-STD-499, Engineering Management, for total system development.

1.3.2 Software quality program. Application of this standard must be coordinated with FAA-STD-018, Software Quality Program Requirements, to provide a complete software quality program.

1.3.3 Firmware. This standard applies to the development or support of the software element of firmware. This standard does not apply to the hardware element of firmware.

1.3.4 Software metrics. This standard must be coordinated with AFSC Pamphlet 800-43, software management indicators, to provide visibility into the acquisition and software development process.

1.3.5 Software configuration management. Application of this standard must be coordinated with FAA-STD-021, Configuration Management (Contractor Requirements), to provide a complete software configuration management program.

1.3.7 Other applications. While the requirements of this standard apply to CSCIs, these requirements may be selectively applied to the development of software not identified as a CSCI (such as software portions of hardware configuration items and firmware, and non-deliverable software). In such cases, the term CSCI may be interpreted to refer to the selected software.

1.4 Tailoring of this standard. This standard contains a set of requirements that must be appropriately tailored for each contract by the contracting agency to ensure that only cost effective requirements are cited.

documents of the issue in effect on the date of invitation for bid or request for proposal, form a part of this standard to the extent specified herein.

FAA Standards

FAA-STD-005	Preparation of Specification Documents
FAA-STD-021	Configuration Management (Contractor Requirements)

Military Standards

DOD-STD-2167	Defense System Software Development

2.1.2 Other government documents, drawings, and publications. None

(Copies of specifications, standards, handbooks, drawings and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting agency or as directed by the contracting officer.)

2.2 Other publications. None.

2.3 Order of precedence. In the event of conflict between the documents listed herein and contents of this standard, the contents of this standard shall be a superseding requirement.

technical requirements shall be the basis for detail design. Establishment of the allocated baseline occurs with the authentication of the development specification.

3.2 Authentication. Determination by the Government that specification content is acceptable.

3.3 Baseline. A configuration identification document or a set of such documents formally designated and fixed at a specific time during a CI's life cycle. Baselines, plus approved changes from those baselines, constitute the current configuration identification.

3.4 Computer data definition. A statement of the characteristics of the basic element of information operated upon by hardware in responding to computer instructions. These characteristics may include, but are not limited to, type, range, structure, and value.

3.5 Computer hardware. Devices capable of accepting and storing computer data, executing a systematic sequence of operations on computer data, or producing control outputs. Such devices can perform substantial interpretation, computation, communication, control, or other logical function.

3.6 Computer resources. The totality of computer hardware, software, personnel, documentation, supplies, and services applied to a given effort.

3.7 Computer software (or software). A combination of associated computer instructions and computer data definitions required to enable the computer hardware to perform computational or control functions.

computer software.

3.10 Computer software documentation. Technical data or information, including computer listings and printouts, which documents the requirements, design, or details of computer software, explains the capabilities and limitations of the software, or provides operating instructions for using or supporting computer software during the software's operational life.

3.11 Computer Software Unit (CSU). An element specified in the design of a Computer Software Component (CSC) that is separately testable.

3.12 Configuration identification. The currently approved or conditionally approved technical documentation for a configuration item as set forth in specifications, drawings, and associated lists, and documents referenced therein.

3.13 Configuration item. An aggregation of hardware/software, or any of its discrete portions, which satisfies an end-use function and is designated by the Government for configuration management. CIs may vary widely in complexity, size, and type; from a system, group, or set to a unit, assembly, subassembly, or part. During development and initial production, CIs are only those specification items that are referenced directly in a contract.

3.14 Contracting agency. As used in this standard, contracting agency refers to the "contracting office" as defined in Federal Acquisition Regulation Subpart 2.1 or its designated representative.

mental Configuration for a CSCI consists of a Software Design Document and source code listings. Any item of the Developmental Configuration may be stored on electronic media.

3.16 Evaluation. The process of determining whether an item or activity meets specified criteria.

3.17 Firmware. The combination of a hardware device and computer instructions or computer data that reside as read-only software on the hardware device. The software cannot be readily modified under program control.

3.18 Formal Qualification Testing (FQT). A process that allows the contracting agency to determine whether a configuration item complies with the allocated requirements for that item.

3.19 Functional baseline. The functional baseline is normally the first baseline established and is usually the product of the system requirements process. It shall be established by authentication of the system specification or item specification. This document becomes the contractor's technical base for accomplishing system requirements analysis and allocating functions to configuration items.

3.20 Hardware Configuration Item (HWCI). See configuration item.

3.21 Independent verification and validation (IV&V). Verification and validation performed by a contractor or Government agency that is not responsible for developing or performing the activity being evaluated. IV&V is an activity that is conducted separately from the software development activities governed by this standard.

3.23 Product baseline. The detailed design shall be documented in the form of a product specification and associated drawings. Authentication of the product specification and/or drawings and interface control or other documentation shall establish the product baseline.

3.24 Release. A configuration management action whereby a particular version of software is made available for a specific purpose (e.g., released for test).

3.25 Reusable software. Software developed in response to the requirements for one application that can be used in whole or in part, to satisfy the requirements of another application.

3.26 Software development file (SDF). A repository for a collection of material pertinent to the development or support of software. Contents typically include (either directly or by reference) design considerations and constraints, design documentation and data, schedule and status information, tests requirements, test cases, test procedures, and test results.

3.27 Software development library (SDL). A controlled collection of software, documentation, and associated tools and procedures used to facilitate the orderly development and subsequent support of software. The SDL includes the Developmental Baseline as part of its contents. A software development library provides storage of and controlled access to software and documentation in human-readable form, machine-readable form, or both. The library may also contain management data pertinent to the software development project.

3.29 Software support. The sum of all activities that take place to ensure that implemented and fielded software continues to fully support the operational mission of the software.

3.30 Software test environment. A set of automated tools, firmware devices, and hardware necessary to test software. The automated tools may include but are not limited to test tools such as simulated software, code analyzers, etc. and may also include those tools used in the software engineering environment.

3.31 System specification. A system level requirements specification. A system specification may be a System/Segment Specification (SSS), Prime Item Development Specification (PIDS), or a Critical Item Development Specification (CIDS).

3.32 Validation. The process of evaluating software to determine compliance with specified requirements.

3.33 Verification. The process of evaluating the products of a given software development activity to determine correctness and consistency with respect to the products and standards provided as input to that activity.

3.34 Version. An identified and documented body of software. Modifications to a version of software (resulting in a new version) require configuration management actions by either the contractor, the contracting agency, or both.

3.35 Definitions of acronyms used in this standard. See Appendix A.

Replace paragraph 4.5.5 of DOD-STD-2167A with the following:

"4.5.5 Engineering Change Proposals. The contractor shall prepare Engineering Change Proposals (ECP) in accordance with FAA-STD-021. The contractor shall prepare Specification Change Notices (SCN) in accordance with FAA-STD-021 and FAA-STD-005."

Delete the last sentence in paragraph 5.7.5.2 of DOD-STD-2167A.

Add the following acronyms to the list:

CI	Configuration Item
FAA	Federal Aviation Administration
NAS	National Airspace System